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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,899	05/10/2001	Alvin P. Short	01 P 08366 US (8055-25)	5432

7590

11/08/2002

Frank Chau  
F. CHAU & ASSOCIATES, LLP  
Suite 501  
1900 Hempstead Turnpike  
East Meadow, NY 11554

EXAMINER
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MAI, ANH D

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 11/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/852,899

Applicant(s)

SHORT, ALVIN P.

Examiner

Anh D. Mai

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Amendment*

1. Amendment filed August 29, 2002 has been entered as Paper No. 5. Claims 7-17 have been canceled. Claim 1 has been amended. Claims 1-6 are pending.

### *Claim Rejections - 35 USC § 103*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-<sup>4 P. 6</sup> are rejected under 35 U.S.C. 103(a) as being unpatentable over Park (U.S. Patent No. 5,677,225) (cited previously) in view of Wu (U.S. Patent No. 5,985,729).

Park teaches a semiconductor device substantially as claimed including:

a trench formed in a substrate (21);

a diffusion region (23) surrounding the trench to form a buried plate (23);

a first conductive material (26') formed in the trench and connecting to the buried plate (23) through a bottom portion of the trench to form a first electrode (26'/23);

a second conductive material disposed in the trench to form a second electrode (33); and

a node dielectric layer (28) formed between the first electrode (26'/23) and the second electrode (33). (See Fig. 2E).

Thus, Park is shown to teach all the features of the claim with the exception of the first conductive material (26') also contacting the buried plate (23) on the lower portion of the side.

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However, Wu teaches semiconductor device including: a first conductive material (14A) is formed through the bottom of the trench (10A) connecting the buried plate (11) on a lower portion of the side walls of the trench. (See Fig. 10).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form the first conductive material (26') of Park in the trench connecting the buried plate through bottom portion and a lower portion of the sidewalls of the trench as taught by Wu to form a capacitor has relative large electrode surface area while occupying a relatively small area of the substrate.

With respect to claim 2, the first conductive material (26') of Park is formed into a plurality of pillars extending from the bottom of the trench.

With respect to claim 3, the plurality of pillars (26') of Park includes the second conductive material (33) disposed between the plurality of pillars (26').

With respect to claim 4, the first conductive material (26) of Park includes one of the material as claimed.

With respect to claim 6, the second conductive material (29) of Park is disposed between the first conductive material (26) and the buried plate (23).

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park '225 and Wu '729 as applied to claim 1 above, and further in view of Chang (U.S. Patent No. 6,077,739) (cited previously).

Park and Wu teach a semiconductor device includes a doped second conductive material (33).

Thus, Park and Wu are shown to teach all the features of the claim with the exception of explicitly using amorphous silicon.

However, Chang teaches a second conductive material (32) is formed of amorphous silicon.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form the second conductive material (33) of Park using amorphous silicon as taught by Chang since amorphous can be deposited at a lower temperature.

#### ***Response to Arguments***

4. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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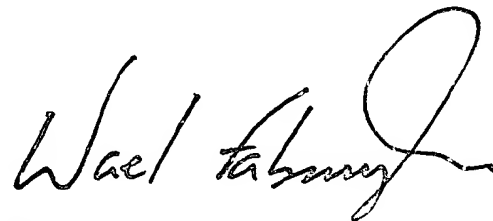
however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (703) 305-0575. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A.M  
November 5, 2002



SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER 2000